Women, Infants, and Children (WIC) Competent Professional Authority (CPA) Training Program

Nutrition Assessment

WIC Anthropometrics Module

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Module Objectives

Knowledge Objectives

- ✓ List four (4) reasons for assessing the weight and length or standing height of WIC applicants / participants.
- ✓ List three (3) factors which influence the growth of infants and children.
- ✓ Identify correct weighing and measuring techniques.
- ✓ Calculate correct ages of infants and children.
- ✓ List: a) two (2) common length / height measurement errors, and
  b) two (2) common weight measurement errors.
- ✓ Identify at what ages to take / use length or standing height measurements of children.
- ✓ Describe the appointments that require weight and length (or height) assessment of WIC applicants / participants (i.e. certification and follow-up visits).
- ✓ Describe what the CDC growth charts tell us.
- ✓ List WIC standards used to define normal versus abnormal growth patterns of children.

Take Action Objectives

- ✓ Demonstrate the proper weighing and measuring techniques for infants and children.
- ✓ Correctly plot information on appropriate growth charts.
- ✓ Explain plotted growth chart information to parents / caregivers.
- ✓ Determine, based on four (4) accurate plots, if the four (4) children are growing within a normal growth pattern or are at nutritional risk due to:
  - short stature
  - potential underweight
  - underweight
  - potential overweight
  - overweight
- ✓ Provide an in-service to 2-3 staff, including your preceptor, about proper procedure for weighing and measuring children.

Introduction

Anthropometry refers to measurements of the body, such as length or height, weight, and head circumference. Length refers to the measurement of 1.) infants and children less than two (2) years of age and 2.) children who are 24-36 months old who cannot stand unassisted or measure <30 inches while lying down. Height refers to the standing measurement of 1.) children over two (2) years of age , 2.) children 24-36 months old that measure > 30 inches and 3.) all women (height is also referred to as stature). In the WIC Program, anthropometric assessment involves measuring weight and length (for infants) or standing height (for women and children) at specific times, depending on age and nutritional status. The measurements are then compared with a reference population of healthy people by using a growth chart. This activity is part of the WIC Program certification procedures. Much can be learned about the nutritional status and general health of WIC applicants and participants when these measurements are used along with dietary data and blood values. Height / length and weight measurements are required to help determine WIC eligibility.

For each certification, at a minimum, height or length and weight must be obtained on all participants. Weight and height or length must be measured not more than 60 days prior to certification for program participation. WIC accepts measurements from the applicant's / participant's physician on official letterhead or prescription pad. If the values do not appear appropriate for the participant's age and / or situation, then the local agency will perform the measurement in the WIC clinic. All women (including teenagers and adults), infants, and children must have their height and weight measured at **every** certification. If an infant is not available for weighing and measuring at the mid-certification health check (not for use at certification), use '999' in place of weight and length and perform the measurements at next month's appointment (only one (1) month of food checks can be issued). If a child can't be accurately measured lying or standing due to a medical / physical disability, such as cerebral palsy, the measurement is to be obtained by the participant's physician. Self-reporting of height and weight is not acceptable, except in the case of infant birth data. Infant birth data can be self-reported by a caregiver or obtained from hospital records / crib card and can be used for the certification of an infant if they were taken less than 60 days prior to certification. The date on which it was obtained must be entered as the Medical Data Date instead of the date of certification. If birth data is used, weighing and measuring the infant again on the date of certification will help establish a growth pattern for the infant. Women must have their pre-pregnancy weight-for-height evaluated and pregnancy weight gain plotted on the same growth grid to assess growth trends.

As a WIC CPA, you have an important role in helping parents and caregivers determine whether or not their children are growing normally. Information you are expected to know is listed on the previous page entitled "Knowledge Objectives." The skills that you will need to appropriately demonstrate and document are listed on the previous page titled "Take Action Objectives."

Factors Affecting Growth

Weight and length or standing height measurements of WIC applicants and participants are essential to:

1. Identify malnourished women, infants, and children.
2. Identify women, infants, and children at risk for malnutrition (in need of early counseling to prevent nutrition-related health problems).
3. Reassure parents that their children are growing normally; help reassure pregnant women that their weight gain is progressing normally.
4. Evaluate the effectiveness of nutrition services.

Growth and development are affected by several factors that interact with one another to determine an individual's growth pattern, including:

1. ENVIRONMENTAL factors, such as quality and quantity of dietary intake, and exposure to disease and illness.
2. BEHAVIORAL factors, such as activity and exercise patterns, or heavy smoking and drug use during pregnancy.
3. GENETIC factors (inherited family characteristics).
4. HORMONAL factors, such as "morning sickness" commonly experienced by women early in pregnancy, which is, in part, due to hormonal changes.

The most important environmental factors causing growth differences in children are quality of their diet, exposure to illness, and the combination of the two. Dietary adequacy and frequency of illness are related to income and education levels. For example, poorer children may fall behind children of higher socioeconomic status in growth. Also, the risk of having a low birth weight baby is higher for women with little or no education. Quality of housing, sanitation, diet, and health care, as well as life-styles that emphasize health promotion, vary widely among socioeconomic groups.

Procedures for Weighing and Measuring

In order to be useful as an indicator of health, measurements must be accurately performed, recorded, plotted on appropriate growth charts, and appropriately interpreted.

Measuring Length

Equipment

✧ *Definitions:*

- Recumbent Length: Length measured while lying down. Children from birth until 24 months and from 24-36 months in children who cannot stand unassisted or measure <30 inches while lying down must be measured using recumbent length.

- Recumbent Length Board: A measuring board with a fixed perpendicular headpiece and sliding footpiece that forms a 90-degree angle with the measurement surface. Used for measuring recumbent length.

Technique

Children from birth-24 months and from 24-36 months who cannot stand unassisted or measure <30 inches must be measured lying down (recumbent length). Two people are needed to measure length. Parents or caregivers should participate in the length measurement to provide reassurance and security to the infant. Measurements should be read to the nearest 1/8th inch.

It is inappropriate to use improvised equipment for measuring length - such as measuring tapes or yardsticks attached to tabletops. Measuring between two pencil marks on an exam table does not provide an accurate measurement. Inappropriate equipment used for measuring has a tendency to measure 'short.' A length measuring device attached to an infant scale is not accurate because the headpiece is not perpendicular nor stationary and the footpiece is not perpendicular to a stable table.

To measure length, follow these steps:

1. Remove shoes, hats, and hair accessories and flatten big hair styles (if possible).

2. Put clean paper cloth on measuring board.

3. Lay child flat on his back in the center of the measuring board.

4. One person (could be the caregiver) cups her hands over the child's ears while holding the child's head firmly against the headboard (child's eyes should be facing the ceiling and the top of his / her head should be against the headboard). The infant's chin should not be tucked in against his chest or stretched too far back.

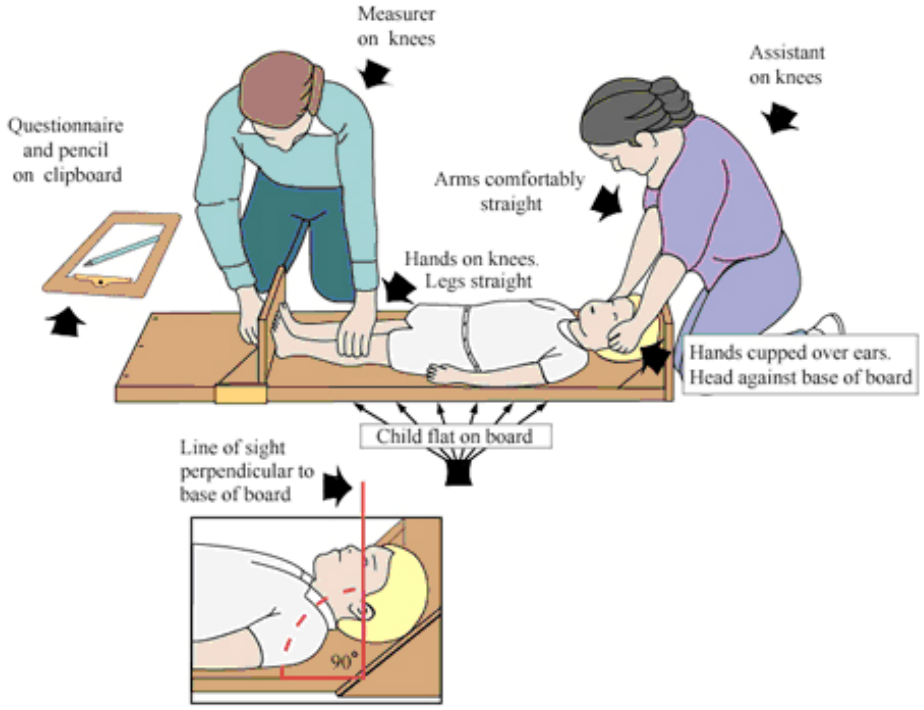
5. The second person brings the child's knees together and gently pushes down on them so that both legs are extended; one of their hands should rest on the child's knees or shins to prevent them from spreading apart or bending, while the other hand brings the movable footboard to rest firmly against the heels (toes should point upward and both feet need to be flat against the footboard). If only one of the infant's legs is extended during the measurement, the measurement may be unreliable and inaccurate.

6. Read the length to the nearest 1/8th inch where the inside of the footboard touches the heel or where the measuring board indicates. Re-position the infant and repeat the measurement. The two measurements should agree within ¼ inch. If the difference exceeds the tolerance limit of ¼ inch, the infant should be re-measured a third time. Record the average of the two lengths that match most closely.

7. Record the length immediately in the AIM computer system on the Medical screen. Today's date will default as the date the measurement was performed.

✧ *Definition:*

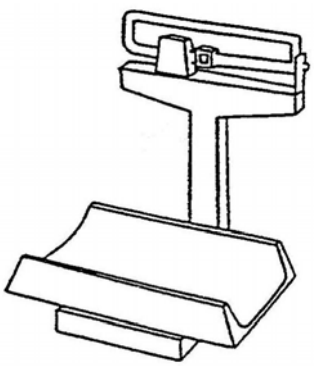
- Frankfurt horizontal plane: A measuring reference where the middle of a person's ear (the hole) is lined up with the bone of the eye socket (just below the eye) when standing looking forward. This may cause the person to be looking slightly downward, but it will allow you to appropriately measure at the crown of the head.

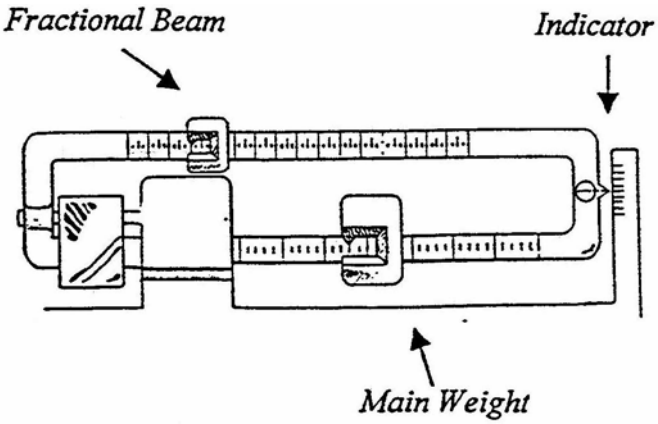


Measuring Weight for Children Less Than 24 Months (2 Years) of Age

Equipment

Infants may be measured with a beam balance scale with a tray and free-sliding weight (non-detachable) or an electronic scale. The scale should be marked in increments of one ounce (1 oz) and have a large enough tray to adequately support an infant or young child who weighs up to 40 pounds (20 kilograms). If a child 24-36 months cannot stand unassisted, they may also be weighed on the infant scale. Children older than 36 months should be weighed standing on a scale. The scale is to be calibrated yearly and the calibration is to be documented.





Technique

1. Put clean paper cloth on scale.

2. Balance the scales at zero (with paper sheet on tray) by placing the main and fractional sliding beam weights directly over their zero positions. If using an electronic scale, zero the scale with the paper sheet on the tray. Make sure the scale is set to measure in pounds and not kilograms.

3. Have the caregiver undress the child, removing the child's outer clothing including shoes, hats, mittens, jackets, sweaters, sweatshirts, and jumpsuits, etc. It is recommended to undress the child to only a dry diaper for accurate weighing. (A wet cloth diaper can weigh as much as 2½ pounds).

   Note: light clothing, such as a t-shirt or onesie, may be worn, based on the temperature of the clinic.

4. Place the young child / infant lying in the center of the scale. Older children up to 24 months do better if placed sitting in the center of the scale. Have the caregiver help by keeping the infant stable and protected from harm (falling, etc.), but they should not touch or hold the infant while being weighed.

5. To take the reading, move the large counter balance on the main beam away from the zero position until the indicator drops, showing that a little too much weight has been added. Then back off to the nearest stop until the indicator rises, showing that a little too much weight has been removed. Repeat the above procedure with the fractional beam until the indicator rests in the exact center.

6. Read the weight to the nearest one ounce (1 oz). Re-position the infant and repeat the measurement. The two measurements should agree within ¼ pound (4 oz). If the difference exceeds the tolerance limit of ¼ pound, the infant should be reweighed a third time. Record the average of the two weights that match most closely.

7. Record the weight immediately in the AIM computer system on the Medical screen. Today's date will default as the date the measurement was performed.

8. Return the weights to the zero position at the left-hand side of the scale to help maintain scale accuracy. Remove the disposable paper cloth.

   Note: The scale should rest on a firm, flat, stable table and care must be taken to protect the child from accidents throughout the procedure.

   Sometimes a child may be unmanageable. Make every effort to obtain as accurate a measurement as possible. Inappropriate counseling and education may result from inaccurate measurements. A parent may worry unnecessarily about poor growth or overweight in their child when the child is actually growing appropriately, or a true growth problem may not be identified with incorrect measurements.

We must have anthropometric data to determine WIC eligibility. Therefore, if a child is hysterical, screaming, kicking, and cannot be comforted, he can be weighed in his caregiver's arms. The caregiver is weighed alone and his / her weight is recorded. The caregiver is then weighed with the child and this second weight is recorded. The caregiver's weight is then subtracted from the second reading (caregiver and child together). Record "weight obtained in caregiver's arms" in the Notes box in the Medical screen in the AIM computer system.

Reading Measurements

When taking the weight of a child, proper technique is very important. Equally critical is knowing how to properly read the measurement. This can be difficult, as each increment on the balance beam infant scale can be quite small. You may also not be familiar with measuring ounces (oz), which really are just fractions of a pound (lb).

The first thing you need to know is that one (1) pound equals 16 ounces. Therefore, one half (1/2) of a pound equals eight (8) ounces.

Rounding Measurements

Most weight measurements will not be exactly on a one-ounce (1 oz) increment. Therefore, you will need to round the reading. Round to the closest ounce as follows:

If the measurement lies closer to one (1) ounce interval than to another, round to the nearest ounce. For example, if your measurement lies closer to 10 ounces than to 11 ounces, then you should round down to 10 ounces; however, if it is closer to 11 ounces, you should round up to 11 ounces.

Measuring Standing Height

Equipment

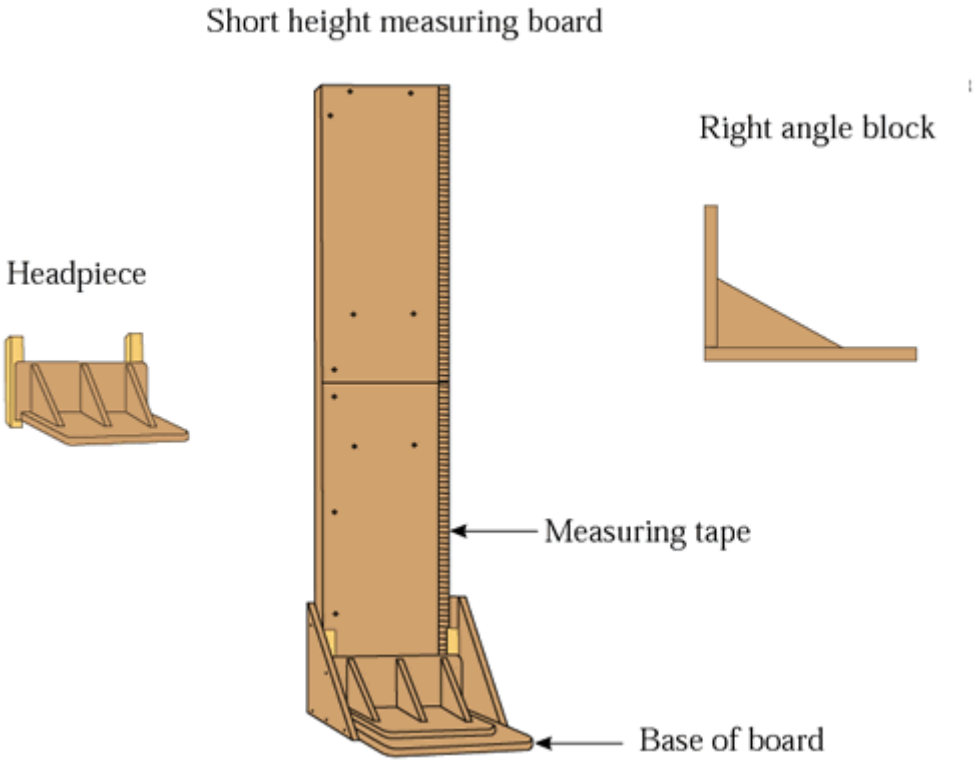
To measure standing height of children two (2) years of age and older and adults, you should use a measuring board with a moveable headboard at least six (6) inches wide. However, if a child is 24-36 months and measures <30 inches, they should still be measured lying down (recumbent length). There should not be carpet underneath the measuring board. It should be mounted and, therefore, immoveable. The equipment must be installed according to manufacturer's instructions and routinely monitored to verify compliance. In satellite clinics, this equipment may be portable; ensure that the base is not too small, thereby making it unstable and not perpendicular to the floor.

Note: The moveable measuring rod on platform scales should **NOT** be used for measuring height. It is not accurate because it is too narrow, unsteady, and can be too easily bent. If possible, the measuring rod should be removed; children often play with the rod and removing it may prevent injury.

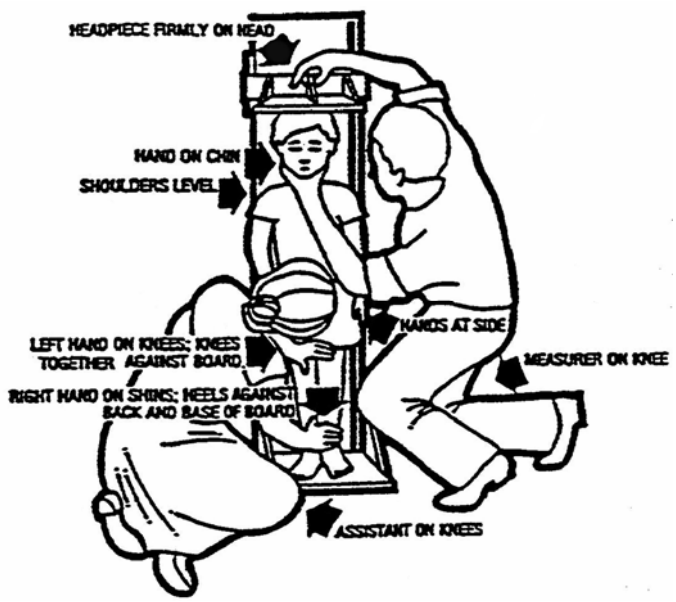
A measuring rule made of flat, metal material can be attached to a wall (or any vertical, flat surface). The rule should be marked in 1/8th inch increments. A headboard or right angle block must be used with this technique. The headboard should be wide enough (at least six (6) inches) to measure only at the participant's crown (i.e. top of head) and create a right angle to the measurement surface.

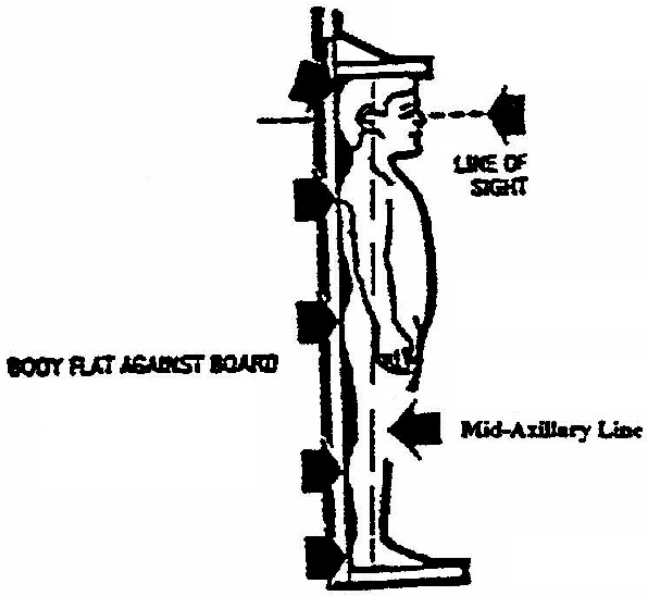
Caution: If mounted on sheet rock, check that it's not working its way down the wall with use.

Staff may need to stand on a sturdy step stool to accurately read the height of adults.



Technique





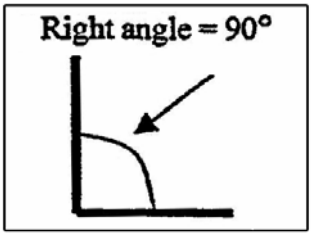
1. Remove shoes, hats, and hair trims and flatten large hairstyles when possible. Place clean paper where child or adult stands.

2. The child or adult should stand tall and straight, with shoulders level, hands at sides, knees or thighs together (whichever touch first), and feet flat on floor or footpiece. The position of the body should follow the **mid-axillary** line where the ear lines up with the middle of the shoulder and the middle of the arch in the foot (see figure on left).

3. The person taking the measurement should be directly to the side of the child or adult. He / she should place his / her hand firmly on the participant's chin.

4. Locate the **Frankfurt plane** by looking at the middle of the participant's ear (the hole) and line it up with the bone of the eye socket (just below the eye). This may cause the participant to be looking slightly downward. It will allow you to appropriately measure at the crown of the head.

5. Lower the headboard (or right angle block) until it firmly touches the crown of the head and creates a right angle with the measurement surface. Ensure that the lower body stays in position by firmly pressing hands on the knees and thighs.



6. Read the stature to the nearest 1/8th inch where the bottom of the headboard touches the measuring tape. Re-position them and repeat the measurement. The two measurements should agree within ¼ inch. If the difference exceeds the tolerance limit of ¼ inch, they should be re-measured a third time. Record the average of the two heights that match most closely.

7. Record the height immediately in the AIM computer system on the Medical screen. Today's date will default as the date the measurement was performed.

Note: It is helpful to have two people taking the stature of a child, one to take the measurement and one to hold the lower body in position. This will not be necessary for adults, but be sure to check positioning before taking the measurement.

If a child or adult has an elaborate hairstyle that cannot be removed, do the best you can. It is recommended to use a flat small implement or a pencil and carefully slide through the base of the hairstyle as close to the crown of the head as possible until it makes contact with the measuring surface. Read where the pencil point hits the measuring surface.

Reading Measurements

Reading the measurement for a standing height is very similar to how you learned to read the recumbent (lying down) length for children up to 24 months. The tape may look a bit different, but the principles are the same. Remember that you are still reading to the nearest 1/8th inch.

Now that you are taking a standing height, it is important that your eyes are at the same level as where you are reading the measurement. Therefore, you may have to bend down when measuring a child or use a step stool when measuring adults.

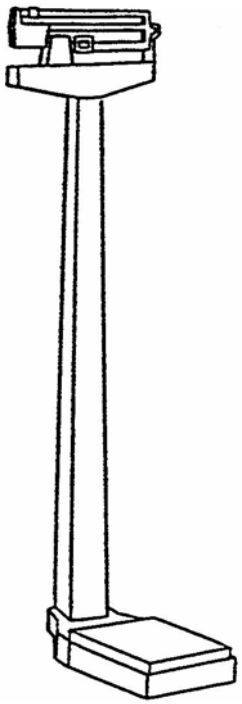
Rounding the Measurement

If you measure the length to be between the 1/8th and 2/8th line, try to determine which one it is closer to and round to that one. If it appears to be directly in the middle, then round down to the lower 1/8th of an inch. For example if it is between 5/8^{ths} and 6/8^{ths}, unless it seems closer to the 6/8^{ths}, round down to the 5/8^{ths} mark.

Measuring Standing Weight of Children 2 Years and Older and Adults

Equipment

A beam balance scale with a platform and free-sliding weights (non-detachable) is the recommended form of equipment. The scale should be marked in increments of four ounces (4 oz) or 100 grams (g) or ¼ pound. The scale should have a large enough platform to support the person being weighed. Electronic scales are also acceptable if this is what is available in your clinic. The scale is to be calibrated yearly and the calibration is to be documented.



Spring balance scales (such as bathroom scales) are not recommended. The spring counter balance loses accuracy over time and many scales are not capable of reading more accurately than ½ pound. Most bathroom scales are difficult to read since measurements are read at floor level.

Technique

1. Place clean paper on foot area. Confirm that the sliding weights on horizontal beam are at the zero position and that the scale is in balance.

2. Remove all heavy clothing and shoes, toys, packages, and purses. Children and adults are ideally weighed in light clothing only. At a minimum, take off shoes or boots, all outerwear, and heavier clothing, such as jackets, sweaters, or sweatshirts.

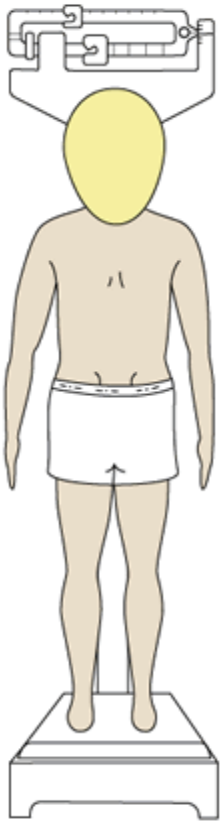
NOTE: For children and adults, there is a need to respect privacy. This includes where the measurements are taken, clothing removal, describing the measuring process, and interpreting the numbers.

3. Have the participant stand in the center of the platform with body upright and arms hanging naturally.

4. To take the reading, move the large counterbalance on the main beam away from the zero position until the indicator drops, showing that a little too much weight has been removed. Repeat the above procedure with the fractional beam until the indicator rests in the exact center.

5. Read the weight to the nearest one ounce (1 oz). Re-position them and repeat the measurement. The two measurements should agree within ¼ pound (4 oz). If the difference exceeds the tolerance limit of ¼ pound, they should be re-measured a third time. Record the average of the two weights that match most closely. Record the weight immediately in the AIM computer system on the Medical screen. Today's date will default as the date the measurement was performed.

6. Return the weights to the zero position at the left-hand side of the scale.



Note**:** The scale should rest on a firm, flat, non-carpeted surface.

Reading the Measurement

When taking the weight of a child over age two (2) or an adult, proper technique is important. Equally critical is to know how to properly read the measurement. As with the infant scale, the scale should read in increments of one (1) ounce.

Remember, 16 ounces equals one (1) pound. So eight (8) ounces equals one half (½) pound and four (4) ounces equals ¼ pound.

Converting ounces to fractions of a pound

Ounces	Pounds
16 ounces	1 pound
8 ounces	½ pound
4 ounces	¼ pound

Rounding measurements

The same rules apply as for all other measurements; round to the nearest ounce (oz). Round down if the measurement lies directly in the middle of two ounce marks or closer to the lower ounce mark; otherwise, round up to the next ounce.

Common Measurement Errors

Accuracy of data collection is dependent upon following procedures and techniques for measuring height or length and weight carefully. It is also necessary to record, plot, and interpret those measurements properly. The goal is to minimize the number of errors that can occur, since many clinical decisions and interventions are based on physical measurements. The list below shows many of the errors to avoid.

All measurements:

1. Improper equipment (i.e. bathroom scales, stretchable tapes not properly attached to the wall)
2. Poorly maintained equipment (i.e. worn, loose, or broken sliding headboards or footboards on recumbent measuring boards)
3. Inaccurate reading due to restless child
4. Scale not adjusted to zero before weighing
5. Reading measurement incorrectly
6. Recording errors

Length:

1. Incorrect equipment used for age of the child
2. Shoes and hats not removed
3. Head not held straight above the body
4. Head not firmly against fixed end of board (head bent to the side)
5. Child not straight along board
6. Body arched
7. Knees bent
8. Feet not parallel to movable board
9. Board not firmly against heels
10. Board not on flat surface

Height:

1. Incorrect equipment used for age of the child
2. Shoes and hats not removed
3. Feet not straight or flat on floor
4. Knees bent
5. Body arched and improperly aligned
6. Frankfurt plane not achieved
7. Shoulders not straight
8. Head not held straight above the body
9. Headboard not firmly on crown of head

Weight:

1. Outer, heavy clothing not removed
2. Child measured with wet diaper
3. Scale not adjusted to zero before weighing
4. Child moving or anxious

Equipment Checklists

All equipment must be used for the purpose for which it is designed.

Infant Scale Checklist

A scale for weighing infants should have a large enough tray to support the infant and weigh to 20 kg or 40 lb.

- ✓ High quality beam balance or electronic digital
- ✓ Weighs to 20 kg or 40 lb
- ✓ Weighs in one ounce (1 oz) increments
- ✓ Tray large enough to support the infant
- ✓ Can be easily 'zeroed' and checked
- ✓ Weight can be 'locked' in
- ✓ Can be read at 'eye level' of measurer (acceptable portable scale during home visits may not have this feature).
- ✓ Can be calibrated
- ✓ Motion detector and stabilizer
- ✓ No length device attached

Infant Lengthboard Checklist

Lengthboards for infants must be sturdy, easily cleaned, and specific to the purpose and have:

- ✓ A firm, inflexible, flat horizontal surface with a measuring tape in 1/8th inch increments
- ✓ Tape is stable and easily read
- ✓ An immovable headboard at a right angle to the tape
- ✓ A smoothly moveable footboard, perpendicular to the tape

Child and Adult Scale Checklist

A scale for weighing children and adults should be stable, ensure privacy, and:

- ✓ High quality beam balance or electronic digital
- ✓ Weight in four ounces (4 oz) or 100 grams (g) or 1/4 lb increments
- ✓ Weight can be 'locked' in (notches on beam balance scale)
- ✓ Weight is read at 'eye level' of measurer
- ✓ Stable weighing platform
- ✓ Can be easily 'zeroed' and checked
- ✓ Can be calibrated
- ✓ No stature device attached
- ✓ Wheels must be locked and not roll when bumped or stood on. The scale must be calibrated every time it is moved to another location.

Child and Adult Stadiometer Checklist

Stadiometers must be stable, calibrated, and dedicated to the purpose. This requires:

- ✓ A vertical board with an attached metric rule
- ✓ An easily moveable horizontal headboard, at least six (6) inches wide, that can be brought into contact with the crown of the head
- ✓ A wide and stable platform or firm uncarpeted floor as the base
- ✓ Firmly mounted on a stable wall
- ✓ Easily read, stable tape or digital readout in 1/8th inch increments

There are many sources of high quality, reliable measurement equipment. These sources include several mail order and web-based companies. The information provided below is intended only as a guide and is not an endorsement of specific products, services, or manufacturers.

- Some distributors of scales are: Tanita, Detecto, Seca, Health o meter, Shorr Productions.
- Some distributors of lengthboards and stadiometers are: Perspective Enterprises, Measurement Concepts.
- Circumference tapes and test or calibration weights are available from Perspective Enterprises.

Note: Portable scales and measuring boards are acceptable if they meet WIC / HHS standards as stated above.

Forms

Equipment Maintenance

Maintenance is a regular, daily event.

1) Scales must be checked and ‘zeroed’ before each daily clinic and between each use.
    - When nothing is being weighed, the scale should register 'zero.'
2) Supervisor is to observe staff on a regular basis to ensure that the scales are ‘zeroed’ every time.
3) Local Agency is required to train all staff on how to ‘zero’ a scale and ensure continuous training.

Calibration Recording Form

Calibration should be a regularly scheduled event, at least yearly. You must maintain documentation that calibration occurred.
1) Scales must be 'tested' with standard weights on at least a yearly basis.
2) Movable scales must be calibrated after each time the scale is moved.
3) Lengthboards and stadiometers must be checked with standard length rods on at least a yearly basis.
4) Moveable length boards and stadiometers must be checked with standard rods after each time the equipment is moved.
5) Each local agency determines what kind of log to keep (sticker / paper / computer tracking). All logs must be kept on file.

Date	Name of person checking equip.	Infant scale checked	Child / adult scale checked	Length-board checked	Stadio-meter checked	Problems Noted

Plotting and Interpreting Growth Charts

Why Use Growth Charts?

Anthropometric growth charts show how a child's growth in length or height and weight compare with those of other children in the United States. The charts are tools that help you identify children who may be at risk for overweight, underweight, or short stature, and those who fall within the average range of weight or height for age and sex. This information, along with accurate dietary information, can help you determine a child's health and nutritional risk status. The CDC growth charts that you will be using represent patterns of growth developed from studies of normal, healthy children. A growth chart is a permanent part of a child's health record so that the health care provider, along with the parents or caregivers, can follow a child's growth over time.

About CDC Growth Charts

The growth charts consist of a series of percentile curves that illustrate the distribution of selected body measurements in U.S. children. Pediatric growth charts have been used by pediatricians, nurses, and parents to track the growth of infants, children, and adolescents in the United States since 1977. The 1977 growth charts were developed by the National Center for Health Statistics (NCHS) as a clinical tool for health professionals to determine if the growth of a child is adequate. The World Health Organization (WHO) also adopted the 1977 charts for international use.

When the 1977 NCHS growth charts were first developed, NCHS recommended that they be revised periodically as necessary. With more recent and comprehensive national data now available, along with improved statistical procedures, the 1977 growth charts were revised and updated to make them a more valuable clinical tool for health professionals. The 2000 CDC growth charts represent the revised version of the 1977 NCHS growth charts. Most of the data used to construct these charts come from the National Health and Nutrition Examination Survey (NHANES), which has periodically collected height, weight, and other health information on the American population since the early 1960's.

Growth charts are not intended to be used as a sole diagnostic instrument. Instead, growth charts are tools that contribute to forming an overall clinical impression for the child being measured. The revised growth charts provide an improved tool for evaluating the growth of children in clinical and research settings.

The 2000 CDC Growth Charts and the New Body Mass Index-For-Age (BMI-for-age) Charts

The revised growth charts consist of 16 charts (eight (8) for boys and eight (8) for girls). These charts represent revisions to the 14 previous charts, as well as the introduction of two (2) new body mass index-for-age (BMI-for-age) charts for boys and girls, ages 2 to 20 years.

Most of the specific differences between the revised charts and the original charts occur in the charts for infants, where national data were previously lacking. The revised head circumference charts also show some noticeable differences when compared to the earlier charts. Compared to the original infant charts that were based on primarily formula-fed infants, the revised growth charts for infants contain a better mix of both breast- and formula-fed infants in the U.S. population. (On average, since 1970, approximately one-half of children born in the United States are reported to have been breast-fed at some point, and about one-third have been breast-fed for 3 months or more.) The addition of the BMI charts is probably the single most significant new feature of the revised growth charts.

These BMI-for-age charts were created for use in place of the 1977 weight-for-stature charts. BMI (wt/ht^2) is calculated from weight and height measurements and is used to judge whether an individual's weight is appropriate for their height. BMI is the most commonly used approach to determine if adults are overweight or obese and is also the recommended measure to determine if children are overweight. The new BMI growth charts can be used clinically beginning at two (2) years of age, when an accurate stature can be obtained.

In recent years, BMI has received increased attention for pediatric use. In 1994, an expert committee charged with developing guidelines for overweight in adolescent preventive services (ages 11-21 years) recommended that BMI be used routinely to screen for overweight adolescents. In addition, in 1997, an expert committee on the assessment and treatment of childhood obesity concluded that BMI should be used to screen for overweight children, ages two (2) years and older, using the BMI curves from the revised growth charts. BMI can also be used to characterize underweight (though no expert guidelines exist for the classification of underweight based on BMI).

Further information about the revision process can be found on the CDC growth charts website.

Interpreting Growth Charts

Growth charts show you how each child’s measurements compare with children of the same sex and age. Each paper chart has smoothed curves or lines with the numbers 5, 10, 25, 50, 75, 90, and 95, which represent growth

percentiles. The charts in the AIM computer system have lines with the numbers 10, 25, 50, 75, 85, 90, and 95. These curves and percentiles serve as reference for comparison. The height and weight of a child will be plotted and then compared to these percentiles. For example, if a 3-year old girl is below the 5th percentile weight-for-age, less than 5% of girls her age in the United States weigh less. Likewise, a 3-year old girl at the 95th percentile weight-for-height weighs more than 95% of girls of any age in the U.S. with the same height. Growth charts, then, can be used to identify children who are potentially underweight or overweight as well as children whose heights and weights fall in the middle ranges.

A growth chart is a valuable tool for assessing how well a child is growing and can be used as an educational tool for parents and caregivers. Several measurements plotted at different ages give information on whether the child's growth is progressing normally. Most children grow along the same percentile curve, although "spurts" are normal.

Procedures for Plotting Growth Charts of Infants and Children

When you enter height or length and weight information into the AIM computer system, it will automatically plot those measurements on the appropriate growth chart for you. Note: If a child 24-36 months is measured standing, you must change the 'R/S' flag in the Medical screen in AIM to 'S' since it defaults to 'R.' If the flag is not changed to 'S' for a child 24-36 months who is standing, AIM will not plot any growth chart. AIM will also calculate the adjusted gestational age of a premature infant and plot the graph accordingly. You can print the growth chart from the AIM system and give it to the parent / caregiver. It is still important, however, that you understand how to manually plot on a growth chart.

Step 1: Calculate age

To plot a child's growth, you first must accurately calculate the child's age. Determine the child's age on the date when the measurements are taken using the following method:

1. Record the date of clinic visit or date measurements were taken (month / day / year).
2. Record the birth date (month / day / year).
3. Subtract the birth date from clinic visit date (or the date the measurements were taken).

When subtracting, it may be necessary to convert months to days and years to months. It may be helpful to label the columns with **m** for month, **d** for day, and **y** for year to help yourself borrow properly and write the age correctly.

Example 1:

	m / d / y
Date of measurement:	2/15/05
Date of birth:	-1/11/02
Child's exact age:	1/04/03 = 1 month, 4 days, 3 years

The exact age would be written 3 years, 1 month, 4 days

Example 2:

	m / d / y
Date of measurement:	11/05/04
Date of birth:	-07/25/03
Child's exact age:	???

In this example, the day of birth is larger than the day of the measurement. Therefore, we cannot do a straight subtraction as in Example 1. Here, it is necessary to "borrow" a month (30 days, in this case) from the month column before subtracting.

	m / d / y	
Date of measurement:	11/05/04	
"Borrowed" month:	10/35/04	("borrow" 1 month, so 11 becomes 10; add these 30 days (1 month) to the 5 to get 35 days)
Date of birth:	-07/25/03	
Child's exact age:	03/10/01 = 1 year, 3 months, 10 days	

This child is 1 year, 3 months, 10 days old.

Example 3:

	m / d / y
Date of measurement:	02/07/04
Date of birth:	-05/28/00
Child's exact age:	???

In this example, the month and day of birth is larger than the month of the measurement. Therefore, we cannot do a straight subtraction as in Example 1. Here, it is necessary to "borrow" a year (12 months) from the year column before subtracting.

Date of measurement:	02/07/04	
"Borrowed" year:	14/07/03	("borrow" 1 year so the 04 becomes 03; add these 12 months (1 year) to the 02 so you get 14;
"Borrowed" month:	13/37/03	(then you must "borrow" 1 month; add these 30 days (1 month) to the 07 so you get 37)

Now, you are ready to do your calculation:

	m / d / y	
Adjusted date of measurement:	13/37/03	
Date of birth:	-05/28/00	
Child's exact age:	08/09/03 =	3 years, 8 months, 9 days

This child is 3 years, 8 months, 9 days old.

Rounding Age

Once you have calculated the exact age of the child, it may be necessary to round that age so that you can plot the measurements accurately. Determine age to the nearest month for infants and ¼-year for children 2 to 20 years of age. The following table gives a guide for rounding ages.

Rounding Guide

Days to Month

0—15 days	Previous month
16—31 days	Next month

Month to Year

0—1 months	Previous year
2—4 months	¼ -year
5—7 months	½ -year
8—10 months	¾-year
11—12 months	Next Year

Step 2: Obtain accurate weights and measurements
Follow procedures that yield accurate measurements and use equipment that is well maintained when weighing and measuring children. See previous section of module on weighing and measuring techniques.

Step 3: Select the appropriate growth chart
Select the proper growth chart to use based on the age and sex of the child being weighed and measured as well as how the measurements were obtained.

Birth to 36 Month Growth Chart
Use this chart for:

- Children under 24 months of age
- Children 24-36 months of age for whom length (child lying down) instead of standing height (child standing up) was measured. This should only occur if:

    1. The length instead of height was reported on a referral form and the child is not available for re-measurement, or the child could not stand unassisted and was measured lying down.

    2. The child is between 24 and 36 months of age and has a standing height of less than 30 inches tall.

There are four (4) different growth charts for Birth to 36 months (separate sets of charts for boys and girls):

- Length-for-age
- Weight-for-age (AIM does not plot this chart)
- Head Circumference (not required for WIC Program)
- Weight-for-length

2 to 5 Year Growth Charts
Use this chart for:

- Children 2-5 years of age when a standing height measurement has been taken and the child measures at least 30 inches in standing height (stature).

There are four (4) different growth charts for 2 to 5 Years (separate sets of charts for boys and girls):

- Stature (height)-for-age
- Weight-for-age (AIM does not plot this chart)
- Weight-for-stature (height)
- BMI-for-age

Step 4: Record Data
After selecting the appropriate chart, you must calculate the child's age and then plot your measurements. Techniques for calculating a child's age will be described in the next section of this module.

Determine age to the nearest month for infants and ¼-year for children 2 to 20 years of age.

Step 5: Calculate BMI
(*Omit this step when using growth charts for children aged 0–24 months.)* BMI is calculated using weight and stature measurements to indicate a child's weight relative to stature compared to other children of the same age and gender. You may also use a BMI chart or BMI wheel to determine BMI. Adult BMI values are interpreted differently; you will read more on this later in 'Calculate the Woman's Body Mass Index.'

With a standard hand calculator, determine BMI using the following calculation:

BMI = Weight (kg) ÷ Stature(cm) ÷ Stature(cm) X 10,000
Or
BMI = Weight (lb) ÷ Stature(in) ÷ Stature(in) X 703

It is necessary to convert the weight and stature measurements to the appropriate decimal value shown below.

Example: 37 lbs. 4 oz = 37.25 lbs. or 41½ inches = 41.5 in.

Decimal Conversions

Fraction	Ounces	Decimal
1/8	2	.125
¼	4	.25
3/8	6	.375
½	8	.5
5/8	10	.625
¾	12	.75
7/8	14	.875

Enter BMI to one (1) place after the decimal point. (Example: 18.53 = 18.5)

See http://www.cdc.gov/nccdphp/dnpa/bmi/index.htm for more information and additional resources on calculating BMI.

Step 6: Plot measurements
Plot the measurements recorded for the current visit on the appropriate growth chart.

Accurate and reliable physical measurements are used to monitor the growth of an individual, detect growth abnormalities, monitor nutritional status, and track the effects of medical or nutritional intervention. Accuracy of plotting is very important since your nutrition counseling will reflect your interpretation of the plot, as well as nutrition risk and eligibility for WIC. Human error can contribute to inaccurate plotting. Errors in placement of the plotting grid intersection in each grid, errors in measurement or errors in recording can result in inaccurate plotting and interpretation of the data. When incorrect information is plotted on a growth chart, it may look like the child has a growth problem when one doesn't exist. It is always good practice to recheck your plots.

If plotting shows a sharp increase or decrease in growth, recheck the plotting, recorded numbers, and, if necessary, retake the measurement.

Using a plotting grid will allow easy, accurate plotting. When using a plotting grid, the following technique may be used:

- For plotting length, height, weight, or BMI-for-age, find the child's length, height, weight, or BMI on the vertical (up and down) axis of the grid. Superimpose the plotting grid on the growth chart, with the horizontal (left to right) line aligned with the child's age.

- Make a dot where the hole in the plotting grid is. Circle the dot to make it more visible.

- When plotting weight for length / height, the same technique may be used, but the length / height will be on the horizontal axis and the weight will be on the vertical axis.

If you do not have a plotting grid, the following technique may be used:

- Find the child's age on the top horizontal axis. When plotting weight-for-length, find the length on the horizontal axis. Use a straight edge to draw a vertical line up from that point.

- Find the appropriate measurement (weight, length, stature, or BMI) on the vertical axis. Use a straight edge to draw a horizontal line across from that point until it intersects the vertical line.

- Make a small dot where the two lines intersect. Place a circle around the dot to make it more visible.

Step 7: Interpret the plotted measurements

The curved lines on the growth chart show selected percentiles indicating the rank of the measure in a group of 100. For example, when a dot is on the 95th percentile line for BMI-for-age, it means that only 5 of 100 children (5%) of the same age and sex have a higher BMI-for-age. Interpret the plotted measurements based on the percentile ranking and the corresponding nutrition indicator shown in the table below. If the percentile rank indicates a nutrition-related health concern, additional monitoring and assessment is recommended.

- Determine the percentile rank.

- Determine if the percentile rank indicates a possible nutritional risk.

- Compare today's percentile rank with the rank from previous visits to identify any major shifts in the child's growth pattern and the need for further assessment. For example, a child whose weight has been tracking on the 75th percentile curve and now is at the 25th percentile curve may still fall in a "normal" range, but this is not a normal growth pattern for that particular child and should be investigated further.

- Measurements falling between the 10th and 90th percentile represent average growth. This average growth range is often referred to as "normal" growth, even though individuals vary greatly in what is normal growth for them. The following terms regarding nutrition implication may be used to discuss growth patterns falling outside of that range.

Anthropometric Indicator	Percentile Rank	Nutrition Implication
BMI-for-Age Weight-for-Length	**At or above 95th**	**Overweight**
BMI-for-Age	**Between 85th and 95th**	**At risk of Overweight**
BMI-for-Age Weight-for-Length	**At or below 10th**	**Underweight or at risk of Underweight**
Stature-for-Age	**At or below 5th**	**Short Stature**
Head Circumference-for-Age (not used by WIC)	**At or below 5th**	**At risk of Developmental Delays**

Once you have interpreted the readings on the growth chart, you will calculate risk factors and discuss the findings with parents / caregivers. Please be sensitive to the feelings of the child and parents / caregivers and do not use "value" or judgmental terms.

For purposes of certification, apply the following values for definition of High Risk:

- **High Risk for Underweight / At Risk for Underweight** – less than or equal to the 10th percentile weight-for-length or BMI-for-age at certification.
- **High Risk – Failure to Thrive** – diagnosed by a physician as self-reported by applicant / participant / caregiver or as reported or documented by a physician or someone working under the physician's orders.
- **High Risk – Low Birth Weight** – weighing less than or equal to 5 pounds 8 ounces (≤2500g) for infants and children less 24 months of age.

If a child has a special medical condition, such as Downs Syndrome, or if their growth does not plot on a standard growth chart, they may need to be charted on a specialized growth chart. These children should be referred to the nutritionist.

Documentation

Growth should be carefully documented. The AIM computer system will maintain an individual's growth chart. The following procedures should be used for paper documentation if needed:

1. A growth chart can be kept in each participant's chart as a permanent document.

2. The same growth chart should be used for each visit. As a child gets older, it may be necessary to change from a Birth to 36 Month growth chart to the 2-5 year old growth chart. (Of course, the Birth to 36 Month growth chart will be kept in the chart for a historical point of reference.)

3. All documentation on the growth chart should be written in ink. The participant's name and birth date must be written in the appropriate areas on the growth chart.

4. The date of the measurement, the child's age, and the actual values for the height and weight must be documented where indicated on the charts.

5. If the child has a short stature, you may want to record height (stature) of parents in the "comments" section on the growth charts (if this information is known).

6. While plotting, once you have established the point of intersection (the point on the grid where the two (2) points meet), circle the point and label it with the date running vertically.

7. If you notice a mistake on your plot, use a pen to make a simple X through the error and initial it. Do not use white out or thick scribbles to remove the error.

8. For children two (2) years and older whose stature measures less than 30 inches, follow the procedures for measuring, recording, and plotting children age two (2) or older who are less than 30 inches.

Gestational (Prenatal) Weight Gain

The prenatal weight gain chart in the AIM computer system is a graph comparing a pregnant woman's weight gain to the recommended pregnancy weight gain range. The recommended weight gain range depends on the woman's pre-pregnancy weight.

Types of Gestational Weight Gain Charts

- Normal Weight Women
- Underweight Women
- Overweight Women

Notice that on each chart, there is a target weight gain range line that corresponds to the woman's pre-pregnancy weight (Normal Weight, Underweight, Overweight). These allow for individual variation and identification of those women whose weight gain is of concern. A different colored line corresponds to the target weight gain range. A yellow line is used for a person who was underweight pre-pregnancy, a pink line for normal weight and a blue line for overweight. A measurement plotted above the line indicates weight gain that is too high and below the line indicates weight gain that is too low.

Every woman's weight gain is not going to fall within the lines. A woman increases her chances of a healthy pregnancy by using these weight gain recommendations as a target during her pregnancy.

The charts are useful for providing a picture of the pregnancy weight gain. They make it easier to detect inappropriate changes in weight over time. The pattern of weight gain is as important as the total weight gain. **A slightly lower or higher rate of weight gain than that recommended is not cause for alarm, as long as there is a progressive increase that is close to the recommended rate.**

Target Weight Gain by Pre-pregnancy Weight

Normal Weight Woman	25-35 pounds
Underweight Woman	28-40 pounds
Overweight Woman	15-25 pounds

Teen less than 19 years old

Normal Weight	35 pounds
Underweight	40 pounds
Overweight	28 pounds

How to Read the Gestational Weight Gain Chart

Vertical Lines

The Gestational Weight Gain Chart has numbers on the bottom of the graph. Each vertical line, running top to bottom, represents 1 week of pregnancy. Note: Trimesters are periods of three months or about 12 weeks. The first trimester includes weeks 1-13, the second trimester includes weeks 13-26, and the third trimester includes weeks 26-40. The weeks are also marked on the top of the graph.

Horizontal Lines

The horizontal lines on the Gestational Weight Gain Chart represent pounds of weight gain or weight loss. The figures above zero represent weight gain and the figures below zero represent weight loss.

Each chart has a set of sloping lines that go up towards the right hand side of the chart. The total target weight gains are found where these two sloping lines cross week 40 of pregnancy.

Weight gain above the top sloping line may show the woman has gained too much weight in the pregnancy. Weight gain below the bottom sloping line may indicate she has not gained enough weight.

The slope of the lines and the areas between them are different for women who were underweight, normal weight, or overweight before pregnancy.

Remember that the recommended weight gain varies, depending on the woman's pre-pregnancy weight and BMI.

Plotting Pregnancy Weight Gain

To plot the prenatal weight gain, you need to determine:

1. Pre-pregnancy Weight Status
2. Pregnancy Weight Gain
3. Weeks of Pregnancy
4. BMI (for counseling on appropriate weight gain)

Pre-pregnancy Weight Status

Assessing pre-pregnancy weight involves determining whether the woman was underweight, normal weight or overweight before she became pregnant.

To do this, you must obtain the woman's height and pre-pregnancy weight.

If the woman does not know her pre-pregnancy weight, the following questions may assist you in determining an approximate weight.

> "Did the doctor or clinic staff weigh you when you found out you were pregnant? What was that weight?"

> "Do you think you gained any weight between the time you became pregnant and when you first were weighed? How much do you think that was?"

If a woman does not remember her pre-pregnancy weight and there are no previous records, you can still evaluate her future weight gain. This will be discussed later.

Calculate the Woman's Body Mass Index (BMI)

BMI is a better indicator of maternal nutritional status than weight alone. BMI is the most common measurement used in the clinical setting to determine weight status.

The BMI is a convenient tool that estimates body composition by direct measurements and calculation. When using the BMI, as with any such tool, there are limitations to consider with individuals. The BMI is as much a measure of lean body mass as it is of fatness or obesity. The BMI is influenced by:

- Stature, especially at younger ages
- Body proportion, especially in shorter-legged individuals
- Lean and fat compartments of the body

To calculate Body Mass Index: BMI = weight in kilograms divided by height in meters squared

$$BMI = \frac{\text{weight (kg)}}{\text{height (meters)}^2}$$

(1 meter = 39.37 inches / 1 kg = 2.2 pounds)

Steps for Calculating BMI:

1. Convert body weight to kilograms
(1 kilogram = 2.2 pounds):

Body weight (pounds) ÷ 2.2 = weight (kilograms)
For example: 132 pounds ÷ 2.2 = 60 *kilograms*

2. Convert height to meters
(1 meter = 39.37 inches):

height (inches) ÷ 39.37 = height (meters)
For example: 65 inches ÷ 39.37 = 1.65 *meters*

3. Calculate body mass index:

weight (kg) ÷ height $(m)^2$ = BMI
For example: 60 kg ÷ (1.65 m x 1.65 m) = 22.03 BMI

Example:
Jane August is 64 inches tall and weighed 115 pounds before she became pregnant. Her BMI is 19.6. Jane is 25 years old.

Determine weight category based on BMI values listed below.

- <19.8 Underweight
- 19.8-26 Normal Weight
- 26.1-29 Overweight
- ≥29.1 Obese

(as defined in Risk 101)

In the previous example, Jane's BMI of 19.6 indicates that she was underweight before she became pregnant.

You can also use the BMI wheel to determine BMI.

NOTE: When you enter the height and weight into the AIM computer system, it will calculate the BMI for you and graph the information on the prenatal weight gain chart.

Pregnancy Weight Gain

Pregnancy Weight Gain = Current Weight – Pre-pregnancy Weight

Jane weighed 130 lbs. today. She has gained (130-115) or 15 lbs.

Calculating Weeks of Pregnancy

The AIM computer system will automatically calculate the weeks of pregnancy when you enter either the woman's EDD (expected delivery date) or first day of LMP (last menstrual period). We start counting weeks of pregnancy from the date her last menstrual period began. If you enter the LMP date, AIM will calculate her EDD.

Your local WIC agency may have gestational wheels for you to use; these vary in design, so ask for assistance on how to use them in your local agency.

Example:

Let's calculate in the AIM computer system the week of Jane August's pregnancy for plotting her current weight.

Jane states her baby is due March 16. Today is December 12. Let's calculate in AIM how many weeks pregnant she is. Jane is 26 weeks pregnant.

After you have entered the date, weight, pre-pregnancy weight, and height, save your information and then click the Graph button. The AIM computer system will plot the pregnancy weight gain grid for you. AIM will track her weight gain / loss throughout her pregnancy as you enter more weight measurements.

To plot the pregnancy weight gain or loss on a paper Prenatal Weight Gain Chart, follow these steps:

1. Select the appropriate weight gain chart based on the women's pre-pregnancy weight status and age.
2. Complete the information in the box at the top of the graph.
3. Find the week of pregnancy that the woman was weighed on the bottom horizontal line of the graph.
4. Place a dot on the grid where the line for the number of pounds gained or lost crosses the line for the week of gestation the weight was obtained.

Note: Medical care providers often change women's EDD later in pregnancy. Check to make sure the EDD is correct in AIM each time you enter a weight. If it has changed, change the date in the computer and replot the weight gain grid.

When Pre-pregnancy Weight is Unknown

If the woman does not know her pre-pregnancy weight, follow these steps at the first WIC visit:

1. Determine the woman's height and weight. From this information and your observation, estimate which prenatal weight gain grid to use. If you are not sure, use the weight gain grid for normal weight women.
2. Complete the information on the top of the weight gain grid.
3. Determine the week of gestation the woman was weighed.
4. Locate the number of weeks gestation on the bottom horizontal line of the grid. Follow that line up to the lower line of the weight gain range estimated to be appropriate for the woman and place a dot on the grid at that point.
5. From the dot, follow the line to find the number of pounds represented by the dot. Subtract this number from the current weight to determine estimated pre-pregnancy weight.

Example:
Veronica Brown does not know her pre-pregnancy weight. You will need to estimate it. Veronica is 62 inches tall and weighed 150 pounds when 20 weeks pregnant. Veronica probably was overweight before she became pregnant, so you select the grid for overweight women. For overweight women, four (4) pounds is the lower target weight gain at 20 weeks. 150-4 = 146. You estimate her pre-pregnancy weight to be 146 pounds.

When future measurements are available, determine the number of pounds gained by subtracting the estimated pre-pregnancy weight from the current weight. If weight is lost, subtract the current weight from the estimated pre-pregnancy weight to determine the pounds lost. Place a mark at the appropriate place on the grid and draw a line connecting the plots.

At 28 weeks, Veronica weighed 160 pounds. She has gained 10 pounds since her last visit. Her total weight gain is 4 + 10 = 14 pounds. The grid shows this second measurement.

The AIM computer system will not plot a prenatal weight gain without a pre-pregnancy weight.

Interpreting Anthropometric Measurements for Pregnant Women

What Can Prenatal Weight Gain Grids Tell Us?

Weight plotted at one point tells us how a woman's weight has changed since she became pregnant. Some women will not be sure about their pre-pregnancy weight. If the pre-pregnancy weight is inaccurate, then we cannot accurately assess weight gained the first time a pregnancy weight is plotted. However, we will have a starting point to accurately assess future measurements during the pregnancy.

Several measurements plotted at different weeks of pregnancy give more reliable information to help determine if the woman is gaining a healthy amount of weight than a single measurement.

The end of this module has sample pregnancy weight gain grids for underweight, normal weight, and overweight women.

Prenatal Weight Gain

Both the pre-pregnancy weight and the weight gained during pregnancy affect the fetal growth and the infant's birth weight. Women who are underweight before pregnancy tend to have smaller babies than heavier women, even when both gain the same amount of weight during pregnancy.

Weight gain goals for underweight women are higher than those for normal weight or overweight women. Overweight pregnant women do not need to gain as much weight to deliver a normal weight infant as women who weigh less.

The table below lists the recommended ranges for weight gain based on pre-pregnancy weight. These guidelines are presented as ranges to help prevent either inadequate or excessive weight gain.

Recommended Weight Gain Based on Pre-pregnancy BMI

Pre-Pregnancy Weight Status	Body Mass Index	Recommended Weight Gain (lbs)
Underweight	<19.8	28-40
Normal	19.8-26	25-35
Overweight	26.1-29	15-25
Obese	≥29.1	About 15 pounds

Very young adolescents may give birth to smaller infants than older women with the same pregnancy weight gain. African-American mothers tend to have smaller infants than white mothers who gain the same amount of weight. Women who smoke during pregnancy may give birth to infants with growth retardation. A higher weight gain during pregnancy may help correct this problem. Thus, young adolescents, African-American women, and smokers should try to gain at the upper end of the recommended range.

Short women, those less than 60 inches, should strive for gains at the lower end of the recommended ranges.

How Fast Should Pregnant Women Gain Weight?

The rate of weight gain is also important. To reach the recommended weight gain ranges listed in the table above, an average rate of weight gain can be given for the different trimesters of pregnancy. The usual weight gain during the first trimester is two to five (2-5) pounds. Weight gain for the 2nd and 3rd trimesters is listed in the table below.

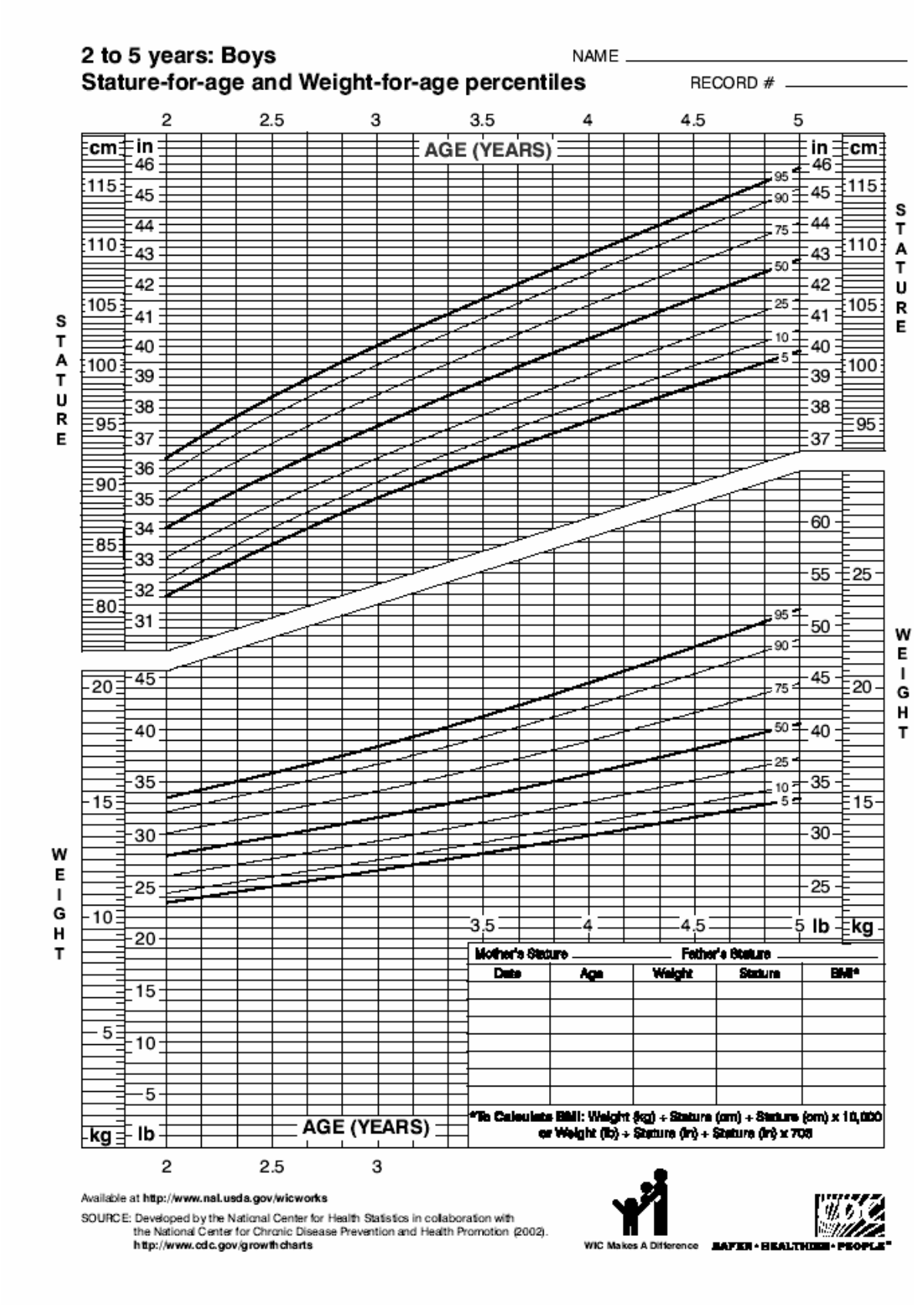
Weekly Rate of Weight Gain During the 2nd and 3rd Trimesters

Pregravid Weight Status	Recommended Gain
Underweight	Slightly more than 1 pound / week
Normal weight	~1 pound / week
Overweight	2-3 pounds / month for overweight women
Obese	Individualize for the obese woman

Remember that the suggested rate of weight gain is the average gain for each week. Very few pregnant women gain weight at the same rate each week.
Other factors to consider in setting weight gain goals for each pregnant client are:

- The quality of the woman's diet
- Her health history
- Her present health
- Her lifestyle
- There are 3500 calories in a pound

Women pregnant with twins should gain more weight than the recommended range. Underweight women should gain 1.75 pounds per week and normal weight women 1.5 pounds per week during the second half of the pregnancy.


2 to 5 years: Boys
Stature-for-age and Weight-for-age percentiles
NAME
RECORD #
AGE (YEARS)
STATURE
WEIGHT
cm
in
lb
kg
95
90
75
50
25
10
5
Mother's Stature
Father's Stature
Date
Age
Weight
Stature
BMI*
*To Calculate BMI: Weight (kg) ÷ Stature (cm) ÷ Stature (cm) x 10,000
or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703
Available at http://www.nal.usda.gov/wicworks
SOURCE: Developed by the National Center for Health Statistics in collaboration with
the National Center for Chronic Disease Prevention and Health Promotion (2002).
http://www.cdc.gov/growthcharts
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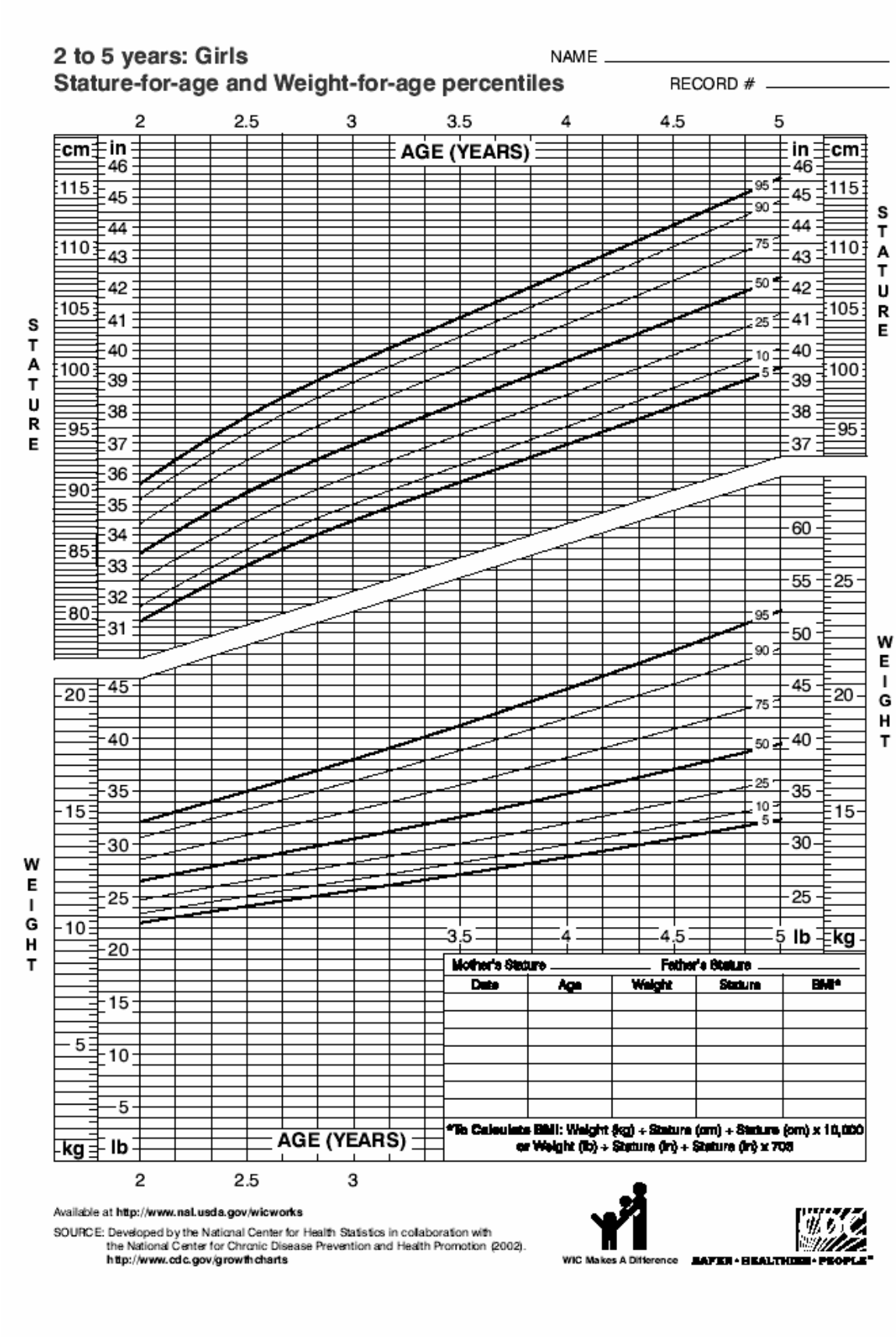
2 to 5 years: Girls
Stature-for-age and Weight-for-age percentiles
NAME
RECORD #
AGE (YEARS)
STATURE
WEIGHT
cm
in
lb
kg
95
90
75
50
25
10
5
Mother's Stature
Father's Stature
Date
Age
Weight
Stature
BMI*
*To Calculate BMI: Weight (kg) ÷ Stature (m) ÷ Stature (m) x 10,000
or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703
Available at http://www.nal.usda.gov/wicworks
SOURCE: Developed by the National Center for Health Statistics in collaboration with
the National Center for Chronic Disease Prevention and Health Promotion (2002).
http://www.cdc.gov/growthcharts
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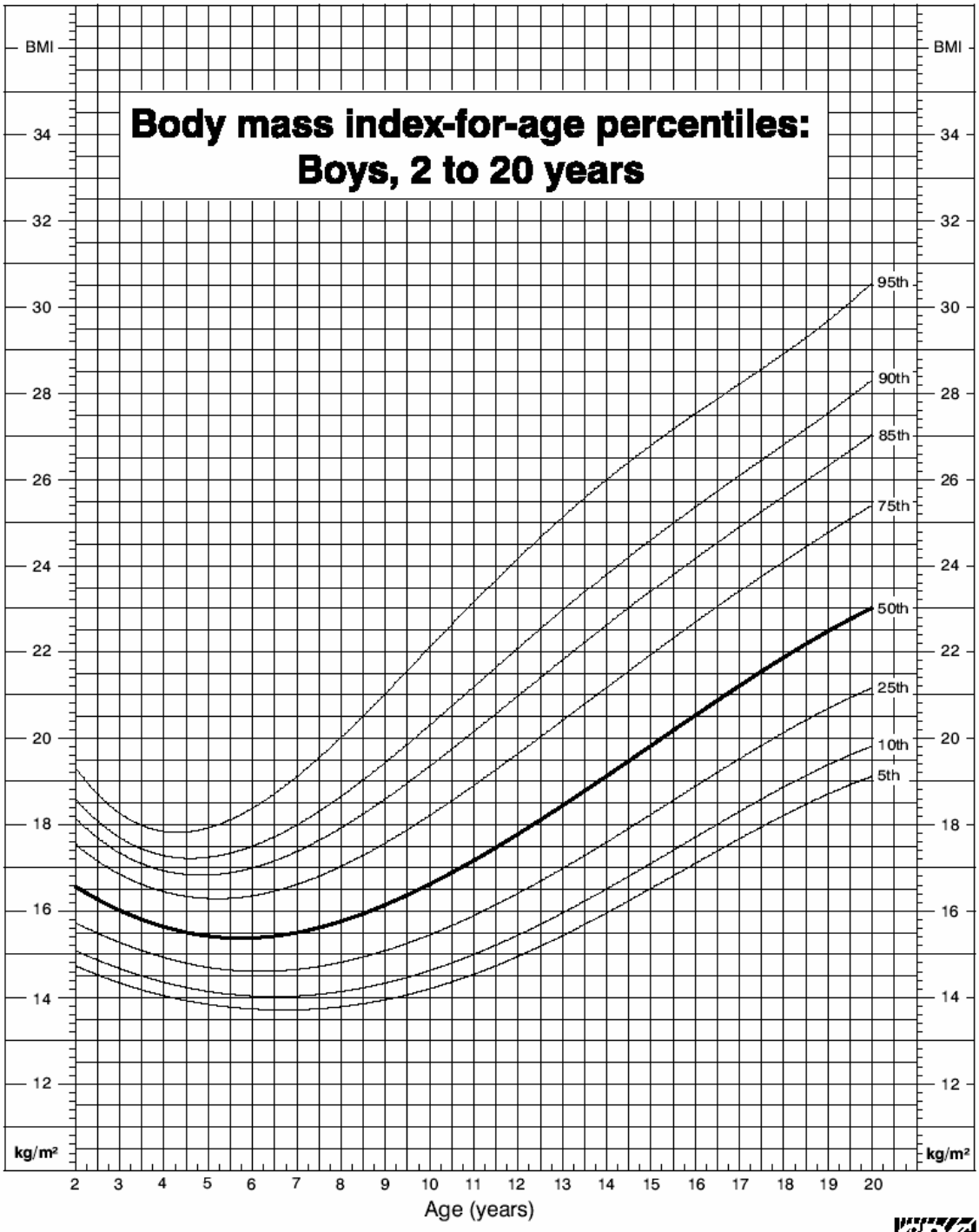
CDC Growth Charts: United States



Published May 30, 2000.
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).

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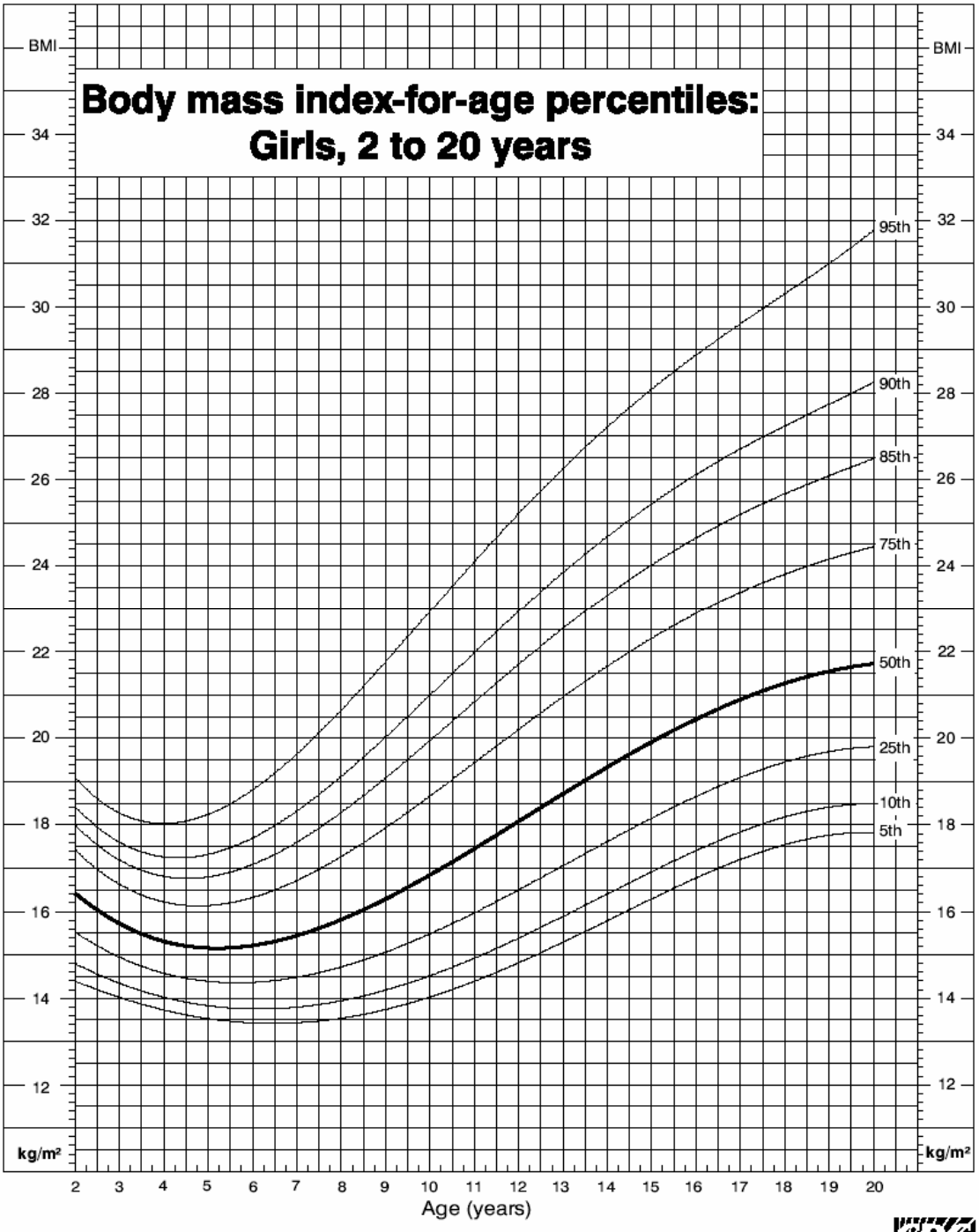
CDC Growth Charts: United States



Published May 30, 2000.

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).

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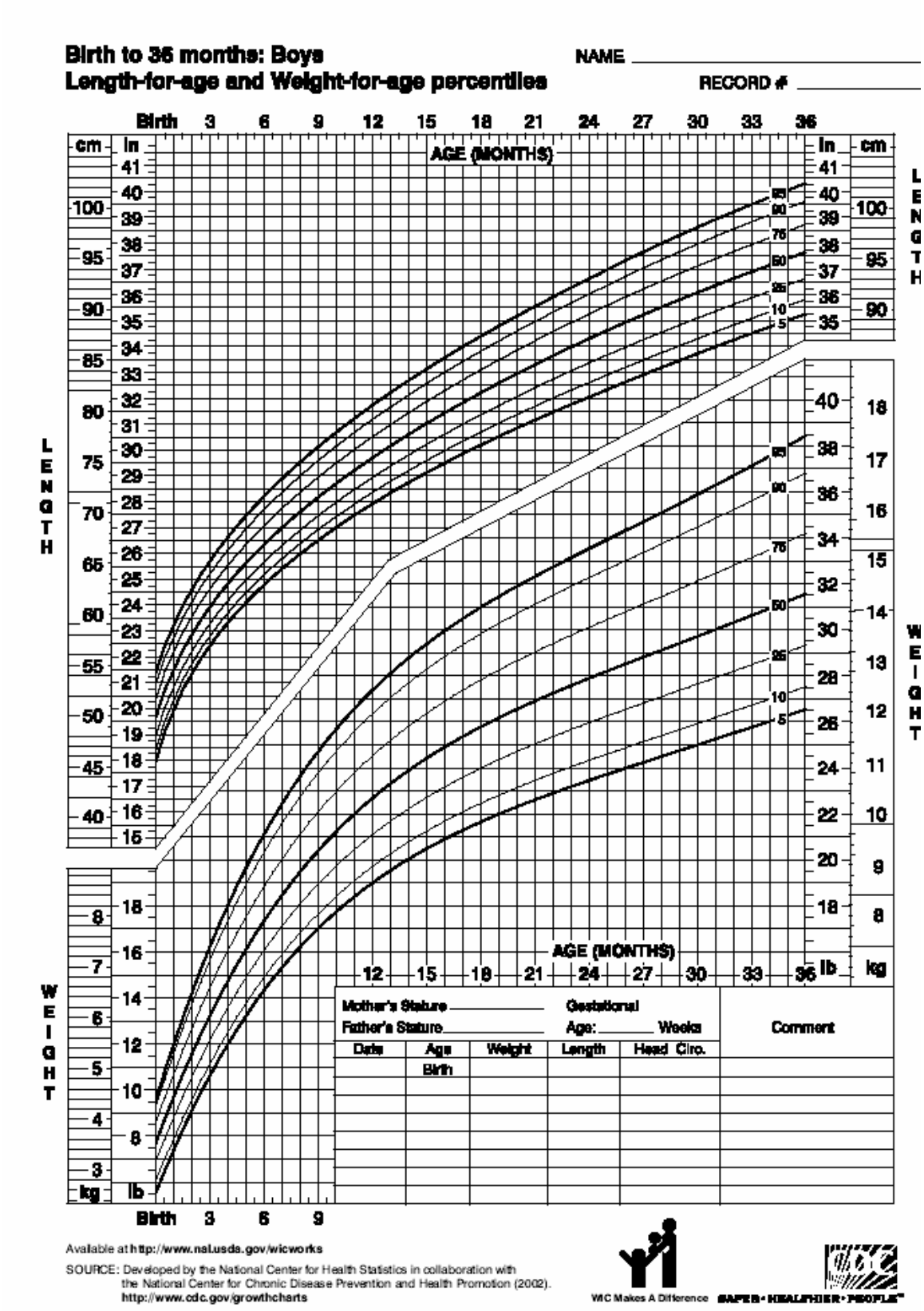
Birth to 36 months: Boys
Length-for-age and Weight-for-age percentiles
NAME
RECORD #
AGE (MONTHS)
LENGTH
WEIGHT
Mother's Stature
Father's Stature
Gestational Age: Weeks
Comment
Date
Age
Weight
Length
Head Circ.
Birth
Available at http://www.nal.usda.gov/wicworks
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2002). http://www.cdc.gov/growthcharts
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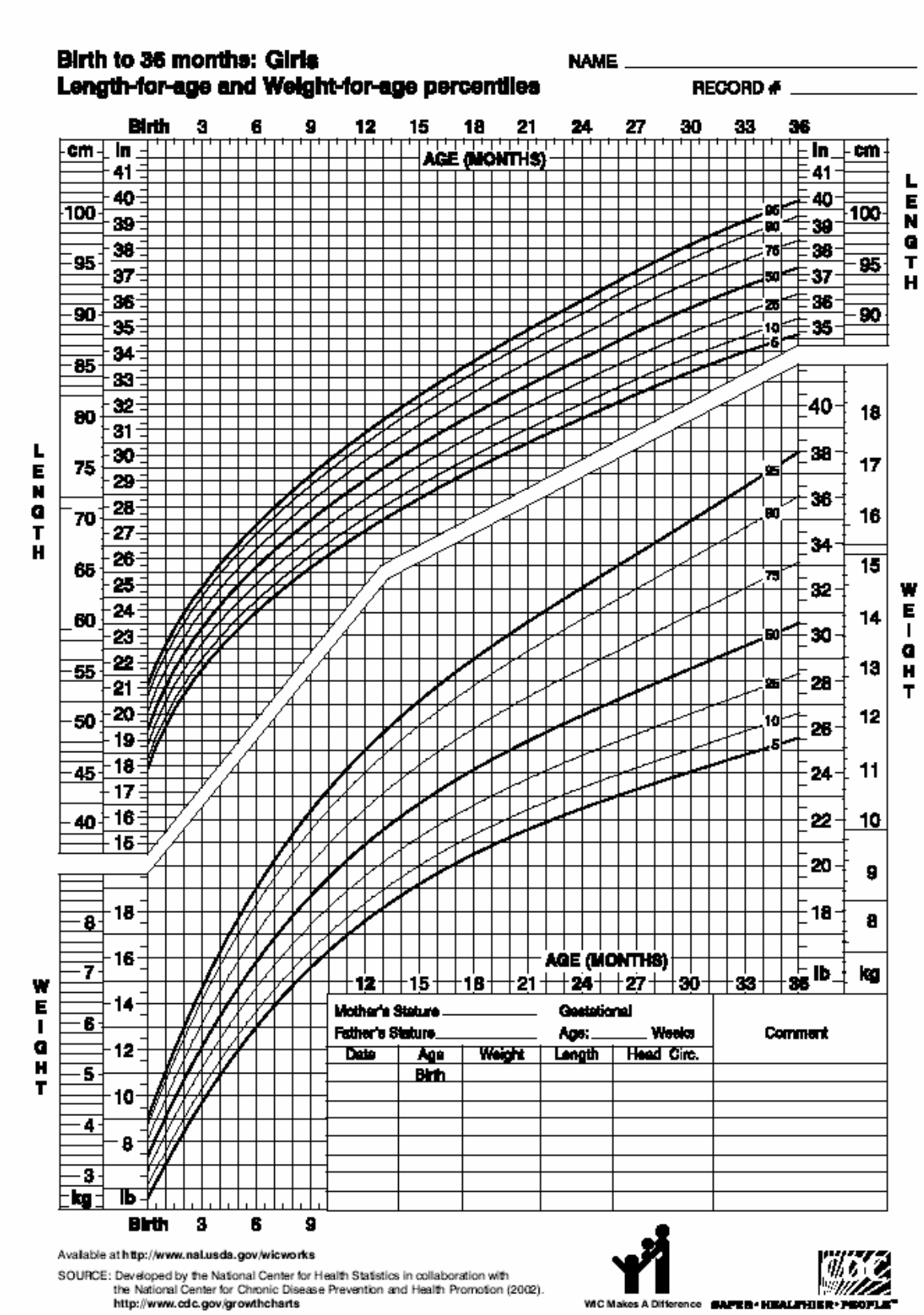
Birth to 36 months: Girls
Length-for-age and Weight-for-age percentiles
NAME
RECORD #
AGE (MONTHS)
LENGTH
WEIGHT
Mother's Stature
Father's Stature
Gestational Ages: Weeks
Comment
Date
Age
Weight
Length
Head Circ.
Birth
Available at http://www.nal.usda.gov/wicworks
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2002). http://www.cdc.gov/growthcharts
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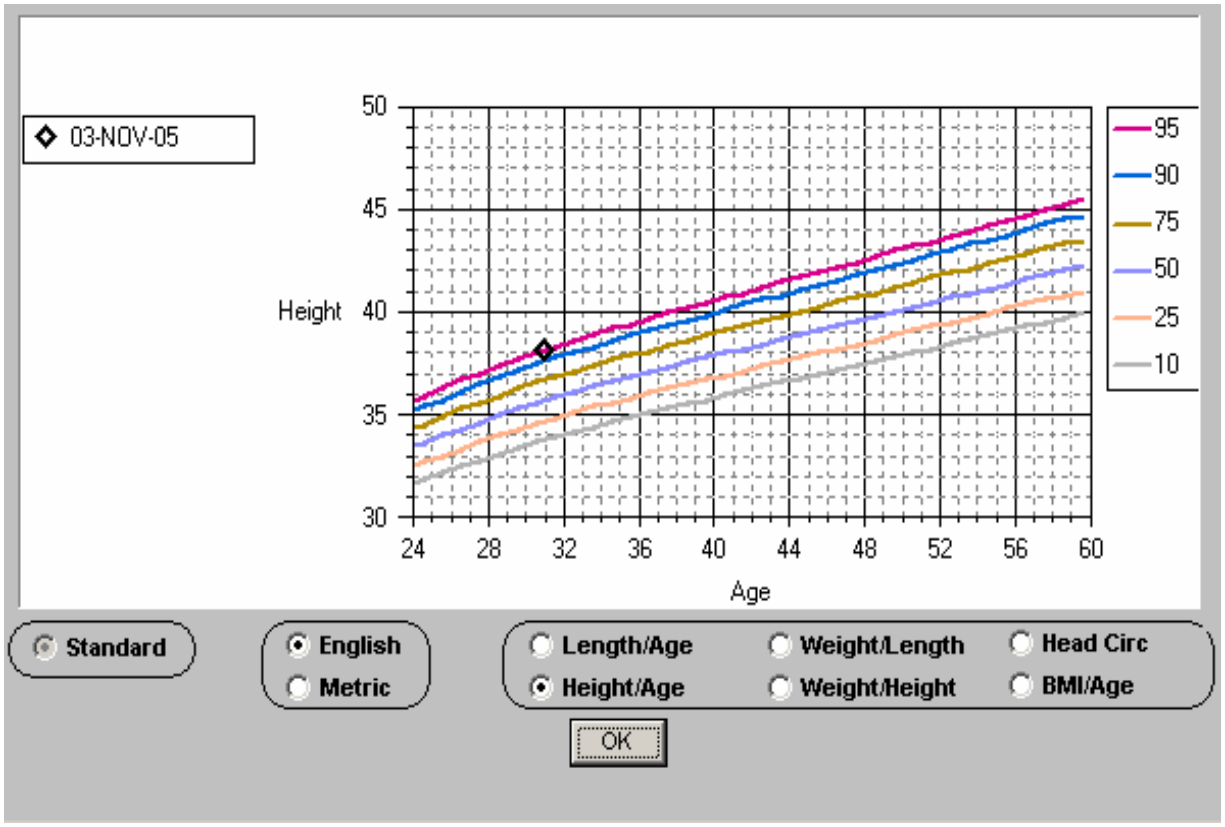
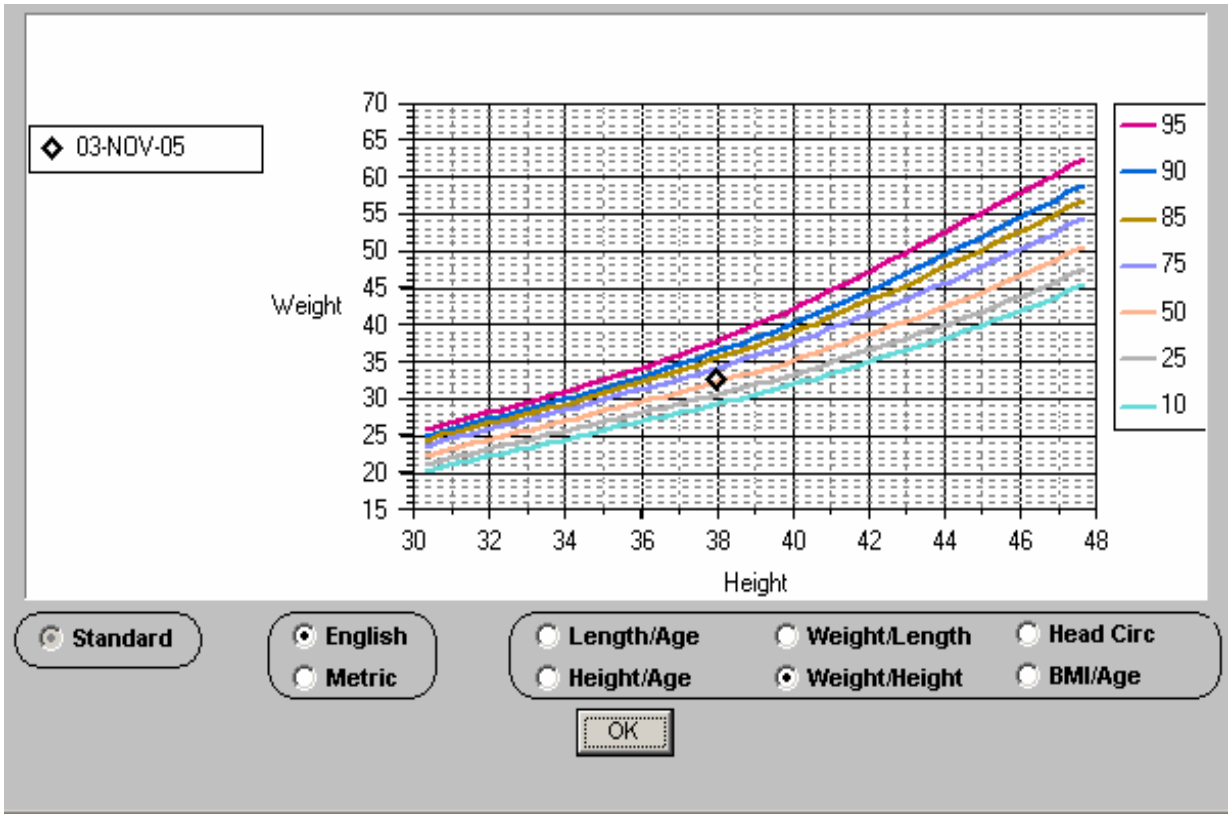
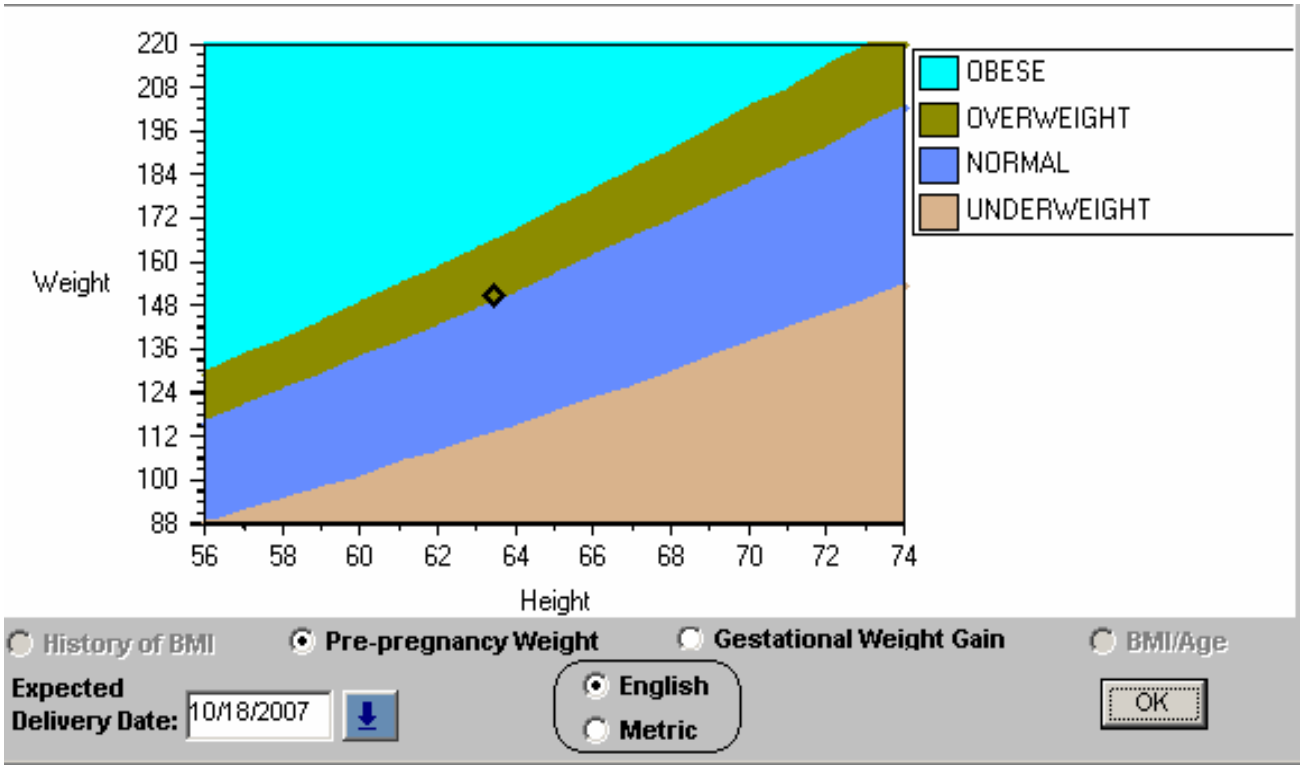
AIM Child Growth Chart (Height / Age)



AIM Child Growth Chart (Weight / Height)



AIM Pre-Pregnancy Weight Chart



AIM Gestational Weight Gain Chart